Installation Instructions

Allen-Bradley

FLEX I/O-XT™ 8-Input Channel Isolated HART Analog Module

Catalog Numbers 1794-IF8IHNFXT

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Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.rockwellautomation.com/literature/) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.
	SHOCK HAZARD: Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.
	BURN HAZARD: Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Environment and Enclosure

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.
This equipment is not intended for use in residential environments and may not provide adequate protection to radio communication services in such environments.
This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.
In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

Prevent Electrostatic Discharge

ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

European Hazardous Location Approval

The following adapters are European Zone 2 approved: 1794-IF8IHNFXT.

The following applies when the product bears the Ex Marking

European Zone 2 Certification (The following applies when the product bears the Ex Marking)
This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC. DEMKO certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in Zone 2 potentially explosive atmospheres, given in Annex II to this Directive.
Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15:2012 and EN 60079-0:2010.

WARNING: Observe the following additional Zone 2 certification requirements:

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment must be installed in an enclosure providing at least IP54 protection when applied in Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Zone 2 environments.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

North American Hazardous Location Approval

The following modules are North American Hazardous Location approved:
1794-IF8IHNFXT

The following information applies when operating this equipment in hazardous locations:	**Informations sur l'utilisation de cet équipement en environnements dangereux:**
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING: EXPLOSION HAZARD • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**WARNING:** RISQUE D'EXPLOSION • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

ATTENTION: Personnel responsible for the application of safety-related programmable electronic systems (PES) shall be aware of the safety requirements in the application of the system and shall be trained in using the system.

ATTENTION: FLEX I/O systems are grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately.

ATTENTION: Do not remove or replace a Terminal Base unit while power is applied. Interruption of the backplane can result in unintentional operation or machine motion.

ATTENTION: If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

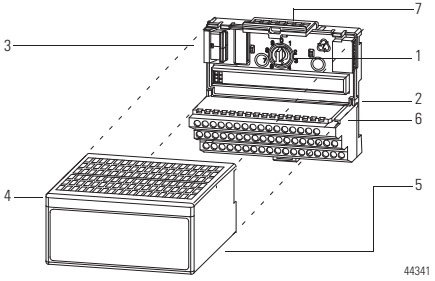
WARNING: When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.

WARNING: If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION: For Class I Division 2 applications, use only Class I Division 2 listed or recognized accessories and modules approved for use within the 1794 platform.

Install the Module

Read this for information about how to install the module, which mounts on a 1794-TB3 or 1794-TB3S terminal base.



Module Description

	Description		Description
1	Keyswitch	5	Alignment bar
2	Terminal base	6	Groove
3	FlexBus connector	7	Latching mechanism
4	Module		

ATTENTION: During mounting of all devices, be sure that all debris (such as metal chips or wire strands) is kept from falling into the module. Debris that falls into the module could cause damage on powerup.

To install the module on a 1794 terminal base, refer to the figure and complete the following.

1. Rotate the keyswitch (1) on the terminal base (2) clockwise to position 3 as required for this type of module.
2. Make sure the flexbus connector (3) is pushed all the way to the left to connect with the neighboring terminal base or adapter.

ATTENTION: You cannot install the module unless the connector is fully extended.

3. Make sure the pins on the bottom of the module are straight so they align properly with the connector in the terminal base.

WARNING: If you remove or insert the module while the backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

4. Position the module (4) with its alignment bar (5) aligned with the groove (6) on the terminal base.
5. Press firmly and evenly to seat the module in the terminal base unit, noting that the module is seated when the latching mechanism (7) is locked into the module.

Wire the Module

WARNING: If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

To connect wiring for 1794-TB3 and 1794-TB3S bases, refer to the tables and figure and complete the following.

1. Connect individual input wiring to numbered terminals on the 0...15 row A, as indicated in the table, using Belden 8761 cable for signal wiring.

ATTENTION: Connect only one current signal per channel.

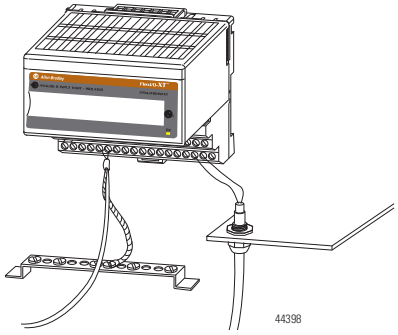
2. Connect each channel signal return to the associated terminal on row A.
3. Connect the +V DC power lead to terminal 34 on the 34...51 row C, and the -V common/return to terminal 16 on the 16...33 row B.

ATTENTION: To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 3 m (9.8 ft) for DC power cabling.

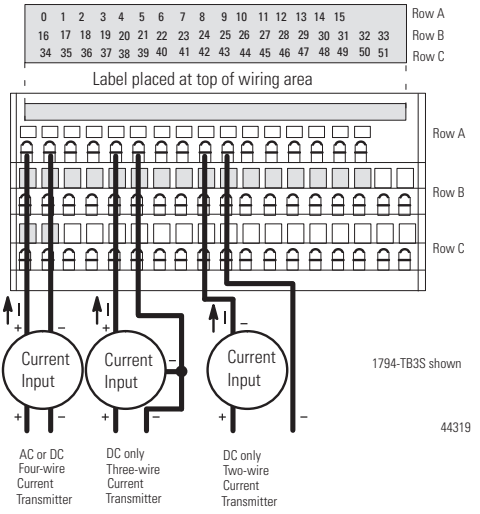
4. If daisy-chaining power to the next terminal base, connect a jumper from terminal 51 (+V DC) on this base unit to terminal 34 on the next base unit.
5. If continuing DC common to the next base unit, connect a jumper from terminal 33 (common) on this base unit to terminal 16 on the next base unit,
6. For both 1794-TB3 and 1794-TB3S bases, connect wiring shields to functional earth ground as near as possible to the module.

Ground the Module

All I/O wiring must use shielded wire. Shields must be terminated external to the module, such as bus bars and shield-terminating feed-throughs.



Module Wiring


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51
Row A
Row B
Row C
Label placed at top of wiring area
Row A
Row B
Row C
Current Input
Current Input
Current Input
1794-TB3S shown
44319
AC or DC Four-wire Current Transmitter
DC only Three-wire Current Transmitter
DC only Two-wire Current Transmitter

Wire Connections

Channel	Signal Type	Label Markings	Catalog Numbers 1794-TB3 or 1794-TB3S Terminal
0	Current	I0	A-0
	Current	I0 Ret	A-1
1	Current	I1	A-2
	Current	I1 Ret	A-3
2	Current	I2	A-4
	Current	I2 Ret	A-5
3	Current	I3	A-6
	Current	I3 Ret	A-7
4	Current	I4	A-8
	Current	I4 Ret	A-9
5	Current	I5	A-10
	Current	I5 Ret	A-11

Channel	Signal Type	Label Markings	Catalog Numbers 1794-TB3 or 1794-TB3S Terminal
6	Current	I6	A-12
	Current	I6 Ret	A-13
7	Current	I7	A-14
	Current	I7 Ret	A-15
-V DC	For catalog numbers 1794-TB3 and 1794-TB3S, terminals B-16…33 are internally connected in the terminal base unit.		
+V DC	For catalog numbers 1794-TB3 and 1794-TB3S, terminals C-34…51 are internally connected in the terminal base unit.		

Input Map

	Bit															
Word	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Channel 0 Input Data															
1	Channel 1 Input Data															
2	Channel 2 Input Data															
3	Channel 3 Input Data															
4	Channel 4 Input Data															
5	Channel 5 Input Data															
6	Channel 6 Input Data															
7	Channel 7 Input Data															
8	H7	H6	H5	H4	H3	H2	H1	H0	L7	L6	L5	L4	L3	L2	L1	L0
9	R7	R6	R5	R4	R3	R2	R1	R0	P7	P6	P5	P4	P3	P2	P1	P0
10	X7	X6	X5	X4	X3	X2	X1	X0	Diagnostic Status							
11	C7	C6	C5	C4	C3	C2	C1	C0	F7	F6	F5	F4	F3	F2	F1	F0
Hn:	Channel n High Alarm									0: False			1: True			
Ln:	Channel n Low Alarm									0: False			1: True			
Pn:	Channel n Out of Range Alarm									0: False			1: True			
Rn:	Channel n Second (Remote) Alarm									0: False			1: True			
Fn:	Channel n HART Failure									0: False			1: True			
Cn:	Channel n HART Current Fault									0: False			1: True			
Xn:	Channel n HART Transmitter Present									0: False			1: True			
Note: Reserved data may not be shown in certain controller software.																

Output Map

Word	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	R	R	R	R	R	R	R	R	HO 7	HO 6	HO 5	HO 4	HO 3	HO 2	HO 1	HO 0
Where:	HOn – HART Off Dynamic Control bit. 1: True; 0: False															

Configuration Map

Word	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	R	R	F7	F6	F5	F4	BOB[1]		R	R	F3	F2	F1	F0	BOA[1]	
1	DH 7	DH 6	DH 5	DH 4	DH 3	DH 2	DH 1	DH 0	Reserved							
2	CH 3 Format				CH 2 Format				CH 1 Format				CH 0 Format			
3	CH 7 Format				CH 6 Format				CH 5 Format				CH 4 Format			
4	HART_Ilimit_CH1				FLTR1				HART_Ilimit_CH0				FLTR0			
5	HART_Ilimit_CH3				FLTR3				HART_Ilimit_CH2				FLTR2			
6	HART_Ilimit_CH5				FLTR5				HART_Ilimit_CH4				FLTR4			
7	HART_Ilimit_CH7				FLTR7				HART_Ilimit_CH6				FLTR6			
8	CH0 High Alarm Threshold															
9	CH0 Low Alarm Threshold															
10	CH0 Remote High High Alarm Limit															
11	CH0 Remote Low Low Alarm Limit															
12	CH0 PvDampingValue (32 bit, Floating Point, LowWord)															
13	CH0 PvDampingValue (32-bit Floating Point, HighWord)															
14	CH0 PvUpperRange (32-bit Floating Point, LowWord)															
15	CH0 PvUpperRange (32-bit Floating Point, HighWord)															
16	CH0 PvLowerRange (32-bit Floating Point, LowWord)															
17	CH0 PvLowerRange (32-bit Floating Point, HighWord)															
18	Reserved								CH0 PV Range Units Code							
19	Unused															
20…31	Words 8…19 for channel 1															
32…43	Words 8…19 for channel 2															
44…55	Words 8…19 for channel 3															

Configuration Map

Word	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
56…67	Words 8…19 for channel 4															
68…79	Words 8…19 for channel 5															
80…91	Words 8…19 for channel 5															
92…103	Words 8…19 for channel 5															
104	Reserved								C7	C6	C5	C4	C3	C2	C1	C0
105	ER7	ER6	ER5	ER4	ER3	ER2	ER1	ER0	ED7	ED6	ED5	ED4	ED3	ED2	ED1	ED0

(1) Not shown in RSLogix 5000 software.

Configuration Map Descriptions

Bit	Description	Value	
BOA BOB	Byte Order Group A Byte Order Group B	Byte order group A and B values must match each other. Refer to the Byte Order table.	
FLTRn	Channel n Digital Filter	Refer to Channel Digital Filter table.	
Fn	Fault mode channel n	0: Local/Remote faults disabled	1:Enabled
CHn HART Current Ratio	HART current fault ratio limit on channel n	Valid values are 0, or 5…31 percent of full scale. A value of 0 disables this feature. Refer to the HART Current Ratio table for more information.	
HART_Ilimit_CHn	HART Loop Tolerance Error Limit for channel n. Defines comparison limit for HART current loop to ADC compare.	Valid values are 0, or from 5 to 31 percent of full scale. A value of zero disables this feature. Full scale is defined as the difference between the normal high scale and the normal low. Example: 4..20mA: 20 - 4 = 16. 5% of 16 is 0.8 mA. Example: 4..20mA: 20 - 0 = 20. 5% of 20 is1.0 mA.	
DHn	Disable HART communication on channel n	0: HART communications enabled	1: HART communications disabled
Cn	HART Data Publishing Disable	0: HART Data Publishing Disable enabled	1: HART Data Publishing Disable disabled
EDn	Enable HART PV Damping Value	0: True	1: False

Configuration Map Descriptions

Bit	Description	Value	
BOA BOB	Byte Order Group A Byte Order Group B	Byte order group A and B values must match each other. Refer to the Byte Order table.	
ERn	Enable HART PV Upper and Lower Range	0: True	1: False
R	Reserved		
CH N Format	Refer to the Channel Data formats table.		

Byte Order

Byte Order Group B		Byte Order Group A		
Bit 9	**Bit 8**	**Bit 1**	**Bit 0**	**Description**
0	0	0	0	Little Endian Format (default) – all data entries in true Little Endian format
1	0	1	0	Word Swap – word swap only values requiring more than one word, for example, 32-bit float values.
0	1	0	1	Byte Swap – byte swap all words in data table.
1	1	1	1	Big Endian Format – all data entries in true Big Endian format.

Channel Digital Filter

Digital Filter Frequency	Decimal Value	Bit		
		10	**9**	**8**
		2	**1**	**0**
242 Hz	0	0	0	0
123 Hz	1	0	0	1
62 Hz	2	0	1	0
19.6 Hz	3	0	1	1
16.7 Hz	4	1	0	0
10 Hz	5	1	0	1
4.17 Hz	6	1	1	0
Not applicable	7	1	1	1

HART Current Ratio

HART Current Ratio Limit	Decimal Value	Bits				
		15	14	13	12	11
		7	6	5	4	3
Disabled	0	0	0	0	0	0
Not applicable	1	0	0	0	0	1
Not applicable	2	0	0	0	1	0
Not applicable	3	0	0	0	1	1
Not applicable	4	0	0	1	0	0
5%	5	0	0	1	0	1
6%	6	0	0	1	1	0
7%	7	0	0	1	1	1
8%	8	0	1	0	0	0
9%	9	0	1	0	0	1
10%	10	0	1	0	1	0
...	…	…	…	…	…	…
30%	30	1	1	1	1	0
31%	31	1	1	1	1	1

Format Values

Format	Format name	0.0 mA	2.0 mA	4.0 mA	20.0 mA	21.0 mA	22.0 mA
0	0…20 mA in Milliamps	0	2000	4000	20000	21000	22000
1	0…20 mA in % Full Scale	0	1000	2000	10000	10500	11000
3	0…20 mA in UINT	0	6554	13107	65535	65535[2]	65535[2]
4	4…20 mA in Milliamps	2000[2]	2000	4000	20000	21000	22000
5	4…20 mA in % Full Scale	-1250[2]	-1250	0	10000	10625	11250
6	4…20 mA in Signed 2's Complement[1]	-7710	-3855	0	30840	32767	32767
7	4…20 mA in UINT	0[2]	0[2]	0	65535	65535[2]	65535[2]

(1) This 4…20 mA format continues to report values all the way down to 0 mA. The other 4…20 mA formats stop reporting @ 2 mA (except for Binary which stops @ 4 mA).

(2) These values are under, or over the supported user range, and are clamped at the lowest/highest supported values.

Channel Data Formats

Format[1]	Bits 15 11 7 3	14 10 6 2	13 9 5 1	12 8 4 0	Format Name	Signal Range		User Range		Resolution
						LO	HI	LO	HI	
0	0	0	0	0	0…20 mA in milliamps	0.00	20.00	0	20000	1.0 µA
1	0	0	0	1	0…20 mA in % full scale	0.00	20.00	0	10000	2.0 µA
3	0	0	1	1	0…20 mA in UINT	0.00	20.00	0	65535	0.3052 µA
4	0	1	0	0	4…20 mA in Milliamps	4.00	20.00	4000	20000	1.0 µA
5	0	1	0	1	4…20 mA in % Full Scale	4.00	20.00	0	10000	1.6 µA
6	0	1	1	0	4…20 mA Signed 2's Complement	4.00	20.00	0	30840	0.5188 µA
7	0	1	1	1	4…20 mA in UINT	4.00	20.00	0	65535	0.2441 µA

(1) All other format is invalid.

Cyclic HART Input Data

The HART input data holds the primary variables for the "live" HART device, and other information gathered during the normal HART scan. Additional "documentary" data is available through the pass through message interface in the device information tables. Pass through messages are defined in detail in the User Manual, publication 1794-UM065.

IMPORTANT The HART Input Data for a channel may be zeroes if HART communications is disabled for that channel. For more information on disabling HART communications, refer to the Disable HART communications and HART CMD 3 Disable functions in the Configuration Map table

HART Input Data

Word	Bit 15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	Prepended by adapter, Cyclic Communication Status															
1	Prepended by adapter, Cyclic Communication Status															
2	CH0 HART Field Device Status								CH0 HART_COM_Status							
3	CH0 PV Status								CH0 HART Loop Status							
4	CH0 HART Primary value (32 bit floating point)															
5	CH0 HART Primary value (32 bit floating point)															
6	CH0 HART Secondary value (32 bit floating point)															
7	CH0 HART Secondary value (32 bit floating point)															
8	CH0 Tertiary value (32 bit floating point)															
9	CH0 Tertiary value (32 bit floating point)															
10	CH0 Quaternary value (32 bit floating point)															
11	CH0 Quaternary value (32 bit floating point)															
12	CH0 SV Units								CH0 PV Units							
13	CH0 QV Units								CH0 TV Units							
14…25	CH1 (Words 1…13)															
26…37	CH2 (Words 1…13)															
38…49	CH3 (Words 1…13)															
50…61	CH4 (Words 1…13)															
62…73	CH5 (Words 1…13)															
74…85	CH6 (Words 1…13)															
86	CH7 (Words 1…13)															

HART Input Data Descriptions

Cyclic Communication Status Bits 0…7 of Word 0	0: Disabled or No Communication Error between Adapter and Module	1: Communication Error between Adapter and Module
CHn: HART Comm Status (HART CMD3 Response first status byte):	Refer to User Manual, publication 1794-UM065	
CHn: HART Field Device Status (HART CMD3 Response second status byte):	Refer to User Manual, publication 1794-UM065	
Chn: HART Loop Status: Bit 0: HART enable Bit 1: Device Connected Bit 2: Response Error Bit 3: CMD 48 Update Bit 4: HART Loop Tolerance Error Bit 5: HART Update Bit 6: HART message Bit 7: PV Configuration Values Mismatch	 0: Disabled 0: Not Connected 0: No HART message failure 0: CMD 48 not updated 0: No Mismatch 0: HART Device information not updated 0: No new message 0: No Mismatch	 1: Enabled 1: Connected 1: Response ended in error 1: CMD 48 updated 1: Analog and HART Loop Values Mismatch 1: HART Device information updated since last read 1: HART user message queue has completed a message 1: PV Damping/Range values mismatch
PV_Status: Bit 0: 01 – The primary variable for this channel has been acquired. Bit 1: 02 – The secondary variable for this channel has been acquired. Bit 2: 02 – The tertiary variable for this channel has been acquired. Bit 3: 02 – The quaternary variable for this channel has been acquired. Bit 4 through 7: Reserved		

Status Indicator

The OK status indicator is bicolor, red, and green. The indicator flashes green for these reasons:

- The module configuration word is zero (for example, powerup reset condition).
- The 24V DC user power is off.
- The module is in Configuration mode.

The indicator displays red to indicate the module did not pass the initial hardware test. Recycle power in response to this display. After powerup, if the status indicator is not

flashing green or solid green, recycle module power to verify a proper reset of the bus interface.

Specifications

General Specifications

Attribute	Value
Number of inputs	8 isolated
Module base	Catalog numbers 1794-TB3, 1794-TB3S
Resolution	16-bits unipolar
Current	0.3052 μA/cnt unipolar; 0.6104 μA/cnt bipolar
Data format	Engineering units[2], Percent Full Scale, Proportional Count
Conversion type	Sigma Delta
Calibration	Factory calibrated. Can be calibrated in field when necessary.
Input current terminal	4…20 mA (user configurable); 0…20 mA (user configurable)
Normal mode rejection ratio	>70 dB @ 50/60 Hz with 4.17 Hz rate >65 dB @ 50/60 Hz with 10 Hz rate >75 dB @ 50 Hz with 16.7 Hz rate >70 dB @ 60 Hz with 19.6 Hz rate
Common mode rejection ratio	>60 dB @ 50 Hz and 60 Hz
Step response to 99% – current terminal	4.17 Hz conversion rate = 480 ms 10.0 Hz conversion rate = 200 ms 16.7 Hz conversion rate = 120 ms 19.6 Hz conversion rate = 101 ms 62 Hz conversion rate = 32 ms 123 Hz conversion rate = 17 ms 242 Hz conversion rate = 14 ms
Channel update time	240 ms – 4.17 Hz conversion rate 100 ms – 10 Hz conversion rate 60 ms – 19.6 Hz conversion rate 51 ms - 19.6 Hz conversion rate 16 ms - 62 Hz conversion rate 13 ms - 123 Hz conversion rate 9 ms – 242 Hz conversion rate
Analog filter frequency	78 Hz

General Specifications

Attribute	Value
Input impedance	249 Ω ±1%
Accuracy	±0.1% @ 25 °C – 4.17…62 Hz sample rates ±0.12% @ 25 °C – 123 Hz and 242 Hz, HART disabled ±0.75% @ 25 °C – 123 Hz and 242 Hz, HART enabled ±0.4% @ -25…70 °C – 4.17…62 Hz sample rates ±0.42% @ -25…70 °C – 123 Hz and 242 Hz, HART disabled ±1.05% @ -25…70 °C – 123 Hz and 242 Hz, HART enabled
Absolute accuracy	0.1% Full scale @ 25 °C
Overload, max	±32 mA continuous
Indicators	1 red/green power/status indicator
Isolation voltage	120V (continuous), Basic Insulation Type Type tested @ 1500V AC for 60 s, between channel to power, channel to system, and power to system, and channel to channel.
Power dissipation, max	4.8 W @ 31.2V DC
Enclosure type rating	None (open-style)
Terminal block screw torque	Determined by installed terminal base.
Wire size	Determined by installed terminal base.
Wire type	Shielded on signal ports.
Power input	80 mA @ 5V DC, FLEXbus 190 mA @ 24V DC, Field power
Thermal dissipation, max	16.4 BTU/hr @ 31.2V DC
Keyswitch position	3
External DC power supply voltage, nom	24V DC
External DC power supply voltage range	19.2…31.2V DC (includes 5% AC ripple)
North American Temp Code	T5
IEC Temp Code	T4
Dimensions (HxWxD), approx.	94.0 x 94.0 x 66.0 mm (3.7 x 3.7 x 2.6 in.) with module installed in base
Wiring category[1]	1 – on signal ports 1 – on power ports

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) Engineering units apply to HART data only.

Environmental Specifications

Attribute	Value
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -25…70 °C (-13…158 °F)
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40…85 °C (-40…185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat) 5…95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10…500 Hz
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Emissions	CISPR 11 (IEC 61000-6-4): Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±3 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±2 kV line-earth(CM) on shielded ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Certifications

Certification (when product is marked)[1]	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection EN 60079-0: General Requirements II 3G Ex nA IIC T4 Gc DEMKO 07 ATEX 0710505X
TÜV	TÜV Certified for Functional Safety[2]: Capable of SIL 2
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation

(1) See the product certifications link at http://www.rockwellautomation.com/products/certification/ for Declarations of Conformity, Certificates, and other certification details.

(2) When used with specified firmware revisions.

ATTENTION: This device is listed only when used with listed Allen-Bradley Catalog Number 1794-TB3 or 1794-TB3S terminal bases.
This device is intended for use with Allen-Bradley type 1794 FLEX I/O programmable controller system.

ATTENTION: To comply with UL restrictions, all connected I/O must be powered from a source compliant with the following:
Isolated Secondary Limited Voltage, Class 2, or Limited Voltage/Current

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support/, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Publication 1794-IN134B-EN-P - June 2014

Supersedes Publication 1794-IN134A-EN-E - June 2013

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